Statistics for Public Health Research

Lecture 10-11

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Measures of Morbidity

- **Incidence rate:**
- The number of new cases of a disease that occur during specific period of time (numerator) in a population at risk for developing the disease (denominator)

Incidence rate

- Incidence is the rate of new (or newly diagnosed) cases of the disease
- It is reported as the number of new cases occurring within a period of time (e.g., per month, per year)
- The incidence rate is reported as a portion of the population at risk of developing the disease (e.g., per 100,000 or per million population).

Incidence rate

- Incidence rates can be categorized according to different subsets of the population.
- by gender,
- by racial origin,
- by age group or
- by diagnostic category.

How to calculate incidence rate

$$\frac{\text{Number of new cases of disease or injury during specified period}}{\text{Time each person was observed, totaled for all persons}}$$

How to calculate incidence rate

- In order to measure the incidence rate of a disease in a population we first need a denominator
- The denominator is a measure of the time spent by each individual in the population at risk of developing illness during the study period

How to calculate incidence rate

	Year	Year	Year	Year	Year	Year
ID Number	1	2	3	4	5	6
1					D	
2						D
3			D			
4						
5						
6						
7					D	
8						
9			D			
10						
Alghamdi						

How to calculate incidence rate

ID Number	Number of years at risk	Disease onset
1	5	Yes
2	5	Yse
3	2	Yes
4	2	No
5	4	No
6	6	No
7	5	Yes
8	4	No
9	3	Yes
10	4	No
Total	40	5

How to calculate incidence rate

- **Incidence rate = 5 ÷ 40 = 0.125 × 100 = 12.5 per 100 person years**

Cumulative Incidence

- Cumulative incidence is calculated as the number of new events or cases of disease divided by the total number of individuals in the population at risk for a specific time interval.

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Cumulative Incidence

Cumulative Incidence (for new cases in a specified period of time):

$$CI = \frac{\text{Number of new cases during a specified period of time}}{\text{Number of total population at risk}}$$

Prevalence Rate

- The prevalence measures the proportion of individuals in a population with a specific disease at a certain point of time.

$$\frac{\text{Old cases} + \text{New cases}}{Population\ at\ risk}$$

How to calculate prevalence rate

- **EXAMPLE**

Five new cases of diabetes were reported, and the prevalence rate in 2017 was 30 per 100,000 population.

Cases = 5

Population at risk = 20,000

Prevalence rate = $^{5}/_{20,000}$ = 0.00025 × 100,000 = 25 per 100,000 population

Prevalence rate

- **<u>Prevalence rates are increased by:</u>**

  An increase in the number of new cases (↑ incidence)

  A reduction in deaths due to disease (↓ mortality)

  New treatments that prolong life but not cure the disease

- **<u>Prevalence rates are decreased by:</u>**

  Reduced number of new cases (↓ Incidence)

  Increased number of cures

Reference

- 1. Rothman KJ; Epidemiology: an introduction. Oxford University Press 2002, p.28-33.

Good Luck for All Students

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سبحان الله وبحمده سبحان الله العظيم

ذكر الله أعظم ما في الوجود ،، لعل الله يرحمنا بعلم تعلمناه في الحياة الدنيا

أستغفر الله